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ABSTRACT

During the 1974-75 academic year, a nationwide survey of public elementary and secondary school environmental education programs and project curricula was conducted. The central focus of this research effort was directed at identifying and describing selected curricular characteristics of such programs and projects, and analyzing these characteristics as they related to specified criterion variables. This publication presents in synopsis form the results of this research effort. Analyses were conducted on responses from 301 responders. A number of conclusions are included regarding use at various grade levels, content selection, sources of materials, staffing patterns, evaluation, and implications for research. Tables for selected data elements are in the appendices. (RH)

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PUBLIC SCHOOL ENVIRONMENTAL EDUCATION PROGRAM: REPORT OF A NATIONAL STUDY

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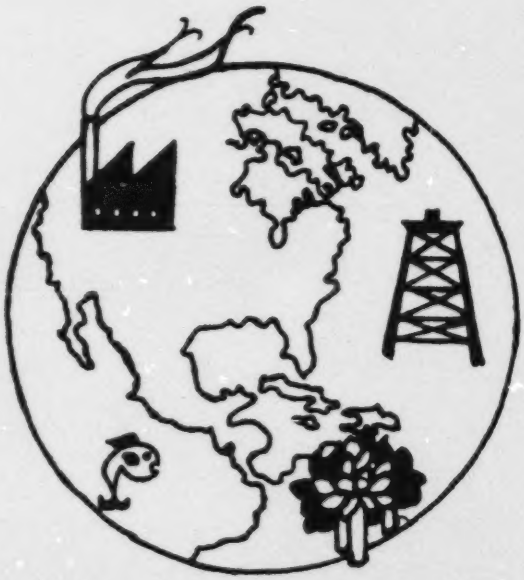

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PUBLIC SCHOOL ENVIRONMENTAL EDUCATION PROGRAM

REPORT OF A NATIONAL STUDY

by

Ronald B. Childress and A. Paul Wishart

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INTRODUCTION

During the 1974-75 academic year, the Science and Environmental Education Area in the Department of Curriculum and Instruction at the University of Tennessee, Knoxville, Tennessee conducted a nationwide survey analysis of public elementary and secondary school environmental education program and project curricula. The central focus of this research effort was directed at identifying and describing selected curricular characteristics of such programs and projects, and analyzing these characteristics as they related to specified criterion variables.

The purpose of this publication is to present in synopsis form, the results of this research effort. A complete presentation of the study findings is available through Interlibrary Loan, The University of Tennessee, Knoxville, Tennessee, 37916.

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Note: Data for this publication resulted from a doctoral dissertation entitled "An Analysis of Environmental Education Program and Project Curricula in Selected Public Elementary and Secondary Schools of the United States" conducted by Ronald B. Childress through the Science and Environmental Education Program Area, Department of Curriculum and Instruction, The University of Tennessee, Knoxville, Tennessee, in the Spring of 1975.

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CHAPTER I

INTRODUCTION

Expanding population, degradation of the land, water and air, depletion of natural resources, urban blight, disappearance of previously abundant flora and fauna, and continually mounting societal tensions are all aspects of what has been generically labeled "the environmental crisis." Reactions to this crisis have been multifarious and have manifested themselves in virtually every aspect of human endeavor. In no area have these manifestations had more potential impact than in the arena of public school elementary and secondary environmental education programs and projects.

Though its philosophical roots can be traced to man's most primitive past, environmental education is a neoteric movement, the infancy of which can be recognized as recently as the mid-nineteen sixties. Such an embryonic state was not to be long retained, however. Following the lead of an action force of dedicated and committed conservationists, educators, public officials and interested citizens, Congress passed the Environmental Education Act of 1970. Heralded as the action necessary to provide the much needed financial support and effective leadership so fundamental to comprehensive environmental education program planning, the Act added new thrust and dimension to the field of environmental education by providing for program development to a variety of institutions, agencies, and groups. Foremost among these were the elementary and secondary public education institutions of the nation.

Five years have elapsed since passage of this Act. The need for environmental education has increasingly been documented by scientists, politicians, educators and laymen, alike (Club of Rome, 1972). Yet, problems abound within the field itself, even with the very definition of environmental education. Serious research efforts in environmental education have been rather narrow in scope and limited in number.

At the time of this study there was no research providing a comprehensive description of the environmental education curricula developed and implemented in the public elementary and secondary schools of the United States. The limited knowledge available was based on scattered research efforts which had concentrated on some subsystem or activity within a given state, district or school. Consequently, this largely discontinuous and fragmentary literature mandated that practitioners utilize common sense or "hunches" for much of their curriculum planning.

THE PROBLEM

Statement of the Problem

Research data describing the general characteristics of public school environmental education curricula are not available. This paucity of information is contributing to communications problems, overlap, duplication of efforts, and in many situations, inefficient utilization of human and fiscal resources. These problems are inhibiting the planning, development, operation and overall effectiveness of environmental education curricula in the nation's public schools.

Purpose of the Study

The purpose of this study was to identify, describe and analyze general curricular characteristics of a selected national sample of public school elementary and secondary environmental education program and project curricula.

Elements of the Study

Elements of the problem addressed in this study were:

1. Analysis of Curricula

   To analyze public school elementary and secondary environmental education program and project curricula with respect to:

   1) Grade level participation
   2) Justification
   3) Objectives
   4) Content selection processes
   5) Curriculum organization
   6) Sources of instructional materials
   7) Instructional strategies
   8) Staff utilization and organization
   9) Evaluation methods and procedures
   10) Curriculum development constraints

2. Sociocultural Environment Differences +

   To determine if there are significant differences among the sociocultural environments of the student populations served and the justification, objectives, sources of instructional materials, and the instructional strategies of public school environmental education program and project curricula.

3. Program Type Differences ++

   To determine if there are significant differences among the justifications, curricular organization, instructional strategies and staff utilization and organization of public school elementary, secondary, and combined environmental education program and project curricula.

4. Sources of Financial Support +++

   To determine if there are significant differences among the sources of financial support and the justification, curricular organization, instructional strategies, and staff utilization and organization of public school environmental education program and project curricula.

5. Curriculum Development Constraints

   To determine if there are significant differences in the constraints to curriculum development as perceived by the study population, and the sociocultural orientation, source of funding, and program type by grade level grouping in public school elementary and secondary environmental education program and project curricula.

\+ A program or project was operationally defined as urban, suburban or rural when at least 60 percent of the participating students were described as representative of an urban, suburban or rural sociocultural environment.

++ A program or project was operationally defined as: (1) Elementary, when environmental education was provided only in some one or more of the elementary grades, kindergarten through grade six; (2) Secondary, when environmental education was provided only in some one or more of grades seven through twelve; and (3) Combined, when environmental education was provided both in some one or more of the elementary grades, kindergarten through grade six, and in some one or more of grades seven through twelve (NEA, 1970, p.6).

+++ A program or project was operationally defined as locally, state or federally funded when at least 60 percent of the total fiscal support was provided by local, state or federal sources.

CHAPTER II

METHODOLOGY AND PROCEDURES

INTRODUCTION

The primary methodology utilized in this study was a direct-mail questionnaire administered to a selected national sample of public school environmental education program and project directors or coordinators. Questionnaire results were analyzed with respect to the criterion variables of sociocultural environment of the participating students, differences among elementary, secondary and combined programs, and sources of funding for the public school programs and projects included in the study population.

IDENTIFICATION OF THE STUDY POPULATION

The study population was comprised of a selected national sample of 536 directors and coordinators of public school elementary, secondary and combined environmental education programs and projects. The study population was established using the following procedures:

1. A mailed survey was administered to all state education agency coordinators for environmental education, requesting that they identify the programs and projects within their respective states which were applicable as components of this study.

2. The ERIC Information Analysis Center for Science, Mathematics, and Environmental Education publication, A Directory of Projects and Programs in Environmental Education for Elementary and Secondary Schools (1974-75), was analyzed to identify those programs and projects which were applicable to the study.

3. A mailed request for assistance in identifying appropriate programs and projects for inclusion in the study population was sent to 33 organizations, agencies and persons known to be working in the area of public school environmental education.

Analysis of the information gathered from the three major sources described above resulted in the identification of 536 public school elementary and secondary environmental education programs and projects. The directors and coordinators of these 536 programs and projects constituted the study population. *

* Names and addresses of study participants have been compiled into a publication entitled A Directory of Public School Environmental Education Programs and Projects by Dr. A. Paul Wishart and Dr. Ronald B. Childress. A limited number of these documents are available by writing Dr. A. Paul Wishart, Science and Environmental Education Program Area, Department of Curriculum and Instruction, The University of Tennessee, Knoxville, Tennessee 37916.

DEVELOPMENT OF THE INSTRUMENT

A direct-mail questionnaire (see Appendix) was utilized as the primary data gathering instrument in this study. A thorough and comprehensive search of the literature, including an ERIC Search, resulted in the development of a draft instrument which was circulated through the writer's doctoral committee for initial reactions. Incorporating the comments received, a second draft was prepared and again circulated within the doctoral committee. A final questionnaire draft, deemed ready for validation through a national panel of experts, resulted.

Segments of the study questionnaire were adapted from an instrument used by Oehler (1973) in a study of secondary school humanities programs in the United States. The adaptation consisted primarily of rewording and restructuring selected items to make them applicable to environmental education, and in part, of introducing and modifying rating scales.

QUESTIONNAIRE RESPONSE

A state by state analysis of questionnaire response is presented in Table 1. Of the 536 questionnaires administered, 64.55 percent or 346 could be accounted for as respondents. Of these 346 respondents, 25 indicated their respective programs were not applicable to the study. A second respondent category was labeled "Miscellaneous" and included 20 responses which were representative of programs no longer operational or were returned because of incorrect address, or for some unidentifiable reason, were returned not completed. Consequently, 301 or 56.16 percent of the total number of questionnaires administered were returned as usable responses.

Geographically, the usable responses were widely distributed. Only three states (Nevada, North Dakota, and South Dakota) were not represented by at least one usable response. The largest number of usable responses came from Pennsylvania (20), Illinois (16), New Jersey (15), and Florida (15). Responses from these four states represented 21.9 percent of the total number of usable responses, however, the total number of questionnaires (105) sent to these four states represented 19.58 percent of the total study population.

The high percentage response and the diverse geographic distribution of these responses did not indicate a need for randomly sampling nonrespondents.

ANALYSIS OF THE DATA

The data collected as a part of this study were most appropriate for the descriptive survey method of reporting. Consequently, the data were reported in tabular form with accompanying narrative descriptions. In all cases the data were reported in terms of frequencies, percentages and totals. However, when the differences in sociocultural environments, sources of funding, program types (grade level), and constraints were analyzed, statistical treatments were applied to determine significant differences among the various group responses to selected questionnaire items. A Chi-square test was employed to determine if there were significant differences at the .05 level.

CHAPTER III

PRESENTATION OF THE FINDINGS

Total population response.

Grade Level Involvement

All questionnaire respondents were requested to indicate each grade level that participated in their respective programs or projects. The data presented in Table II summarizes these responses.

The data indicate the largest participation by grade level to be in grades five, six, ten, eleven and twelve. In all five grade levels, more than 60.0 percent of the respondents reported participation in their program or project. Grades eleven and twelve show the highest degree of involvement with 68.4 percent and 69.1 percent of the respondents indicating participation.

The kindergarten and grades one, two and three, were the levels at which there was the least percentage involvement. (Table II) Of the total group, only kindergarten fell below the 50 percent involvement level with 134 (44.5 percent) respondents reporting participation of kindergarten students in their programs. Although kindergarten and grades one, two and three were the grade levels representing the lowest percentage involvement, the reader should note the relatively small percentage range between grade three and the succeeding four grade levels when considered in an increasing rank order fashion. These four grade levels, four, seven, eight, and nine, all fall within a range of from 55.1 percent to 57.5 percent involvement.

In summary, a high degree of involvement was found in grades five, six, ten, eleven and twelve, and a rather low percentage of involvement for kindergarten. At all other grade levels (e.g., one through four and seven through nine), participation was reported in over half the projects and programs in the study population.

Program/Project Justification

Fundamentally related to the durability, viability and long range effectiveness of any environmental education program are those factors which influence and undergird total program justification. Survey respondents were requested to indicate the degree to which each of a selected list of program or project justifications influenced the development of the overall justification for their respective program or project. The data summarizing these responses are presented in Table III.

As indicated by the data in Table III, the justifications most often noted as "Primary" influences were "Ecological", "Conservationist", and "Educational". Respondents noted these three as "Primary" influences in more than 75 percent of the programs and projects.

The most often noted "Secondary" influence on program or project justification was "Techno-Scientific", with 51.8 percent of the respondents marking as such. Four other justifications, "Sociological", "Political", "Historical", and "Philosophical", were reported as "Secondary" influences by more than four of every ten directors or coordinators responding.

When the percentages of "Primary" and "Secondary" influences for each justification were totaled, the following had some degree of influence on program or project justification in more than 90 percent of the study population: "Conservationist", "Ethical", "Sociological", "Educational", "Ecological", "Relevance", and "Problem-Solving". Consistent with their "Primary" influence on program and project justifications, "Educational", "Ecological" and "Conservationist" justifications were again the three top influences with total "Primary" and "Secondary" percentages of 97.3, 98.3 and 95.7 percent, respectively.

When those justifications considered "Not an Influence" were addressed, "Religious" received the largest percentage response. More than 60 percent of the respondents indicated the "Religious" justification was "Not an Influence" on the justification for their program or project. Additionally, 50.8 percent of the subjects indicated the "Economic" justification was "Not an Influence" on the justification for their program on project. No other justification was near these two in terms of the percentage of respondents indicating it was "Not an Influence" on program or project justification. As a point of interest, 47.9 percent of the respondents did indicate that the "Economic" justification had some influence either "Primary" or "Secondary" as a justification for their program or project, while only slightly over half of the respondents felt the "Aesthetic" justification was a "Primary" influence.

In summary, "Educational", "Ecological" and "Conservationist" justifications were indicated as the "Primary" influences on the development of justifications for a majority of the study environmental education programs and projects. Conversely, the data also indicate "Religious" and "Economic" justifications as not having an influence on the justification of more than half the programs and projects included in the study population.

Program/Project Objectives

The specific nature of the objectives of environmental education programs and projects has been widely discussed in the literature. Table IV presents data differentiating among those which are "Primary" objectives, those which are "Secondary" objectives, and those which are "Not" objectives of the programs and projects included in the study population.

Only Objective 1 (Become knowledgeable concerning their total environment...) and Objective 13 (Develop an appreciation for their environmental resources) were felt to be "Primary" objectives in 80 percent or more of the programs and projects included in the study. (Table IV) Objective 1 was the most often noted as 87.7 percent of the respondents indicated this was a "Primary" objective in their program or project. Objectives 2 (Understand the importance of the environment...), 12 (Recognize the need for man to correct environmental abuses.), and 14 (Develop a positive environmental ethic.) were reported as "Primary" objectives by more than seven of every ten directors or coordinators responding.

Objective 6 (Synthesize various alternative solutions...), 9 (Develop proficiency in environmental data collecting techniques.), 7 (Evaluate how varying value systems....), and 5 (Analyze the role of contributing factors ....) were the least often noted as "Primary" objectives in the study population programs and projects. Only 23.3 percent of the respondents con-

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sidered Objective 6 as a "Primary" program or project objective. Conversely, these same objectives, with the addition of Objective 8 (Work directly with environmental problem solving.), received the greatest percentage response as "Not" an objective of the programs and projects included in the study. Seventy-one respondents (23.6 percent) indicated Objective 6 was "Not" an objective of their program or project.

Table IV reveals a pattern which depicts the programs and projects included in the study as having "Primary" objectives which are focused on becoming knowledgeable about the environment and its associated problems and developing an appreciation of environmental resources. Similarly, the data indicate these same programs and projects consider of lesser importance those objectives (5,6,7,8, and 9) which are oriented toward actual environmental problem solving and the development of problem solving skills.

Program/Project Content Selection

Involvement in the selection of content and the factors influencing such selection are important aspects of any environmental education program or project. Study participants were requested to indicate whether a selected list of potential participants in the content selection process had had "Primary" involvement, "Secondary" involvement or "No Involvement". Additionally, questionnaire recipients were requested to indicate the degree to which a given list of factors influenced the selection of content in their program or project. Data resulting from these responses are summarized in Tables V and VI.

Concerning the degree of involvement in the content selection process, the data in Table V indicate that teachers working in the program had "Primary" involvement in selecting the content in 81.1 percent of the participating programs and projects. The program director, project director or coordinator and the students participating in the program ranked a rather distant second and third in terms of "Primary" involvement. However, when the "Primary" and "Secondary" involvement percentages were summed, the data indicate that these two groups had some degree of involvement in content selection in approximately 90 percent of the programs and projects reporting.

Aside from the three groups previously discussed, only one other participant group who had important "Primary" involvement (Representatives from cooperating resource agencies) of the programs or projects was found. State education agency personnel (8.6 percent), local school parents (9.0 percent), and community representatives (10.6 percent) were the groups with the least percentage of "Primary" involvement. Conversely, these same groups, with the addition of other school administrators and consultants, were noted by respondents as having had "No Involvement" in the content selection process in the greatest percentage of programs and projects.

Table VI presents the data describing the factors influencing the selection of program content. Three factors, the personal and social needs of the students, student interest, and teacher interest were "Primary" influences in the greatest number of programs or projects. Better than six of every ten respondents indicated one or all of these was a "Primary" influence. Local environmental problems and concerns, and beliefs based on how students learn were "Primary" influences in more than half the programs and projects responding.

Those factors not exerting an influence in the largest percentage of programs or projects were the availability of a state adopted textbook (86.7 percent) and legislative mandate (81.4 percent). A related factor, a state environmental education plan or curriculum guide was scored as being of "No Influence" by 56.8 percent of the respondents. Similarly, a commercially prepared environmental education program was reported as "No Influence" in the selection of content in 73.1 percent of the programs and projects.

Locally prepared environmental education curriculum guides were reported as a "Primary" influence in 37.9 percent of the programs and projects. However, another 38.9 percent reported them as having "No Influence" on content selection. Locally adopted materials already in the schools were reported as having "No Influence" in approximately one-half (49.8 percent) of the programs and projects.

Interestingly, teacher competencies were considered a "Primary" influence in the selection of content in only 42.9 percent of the cases. However, when the "Primary" and "Secondary" influences were summed, nine out of every ten respondents reported some degree of influence from this factor.

Adherence to guidelines associated with applications for financial support was reported as having "No Influence" on content selection in 61.1 percent of the cases. When the "Primary" and "Secondary" categories were combined, 39.9 percent of the respondents indicated adherence to such guidelines was a factor influencing content selection.

Two other related potentially influential factors were provided by the respondents. Data in Table VI indicate that predetermined behavioral or performance objectives served as a "Primary" influence on content selection in only 20.3 percent of the participating programs and projects. One hundred seventeen or 38.9 percent of the subjects indicated this factor was of "No Influence" in their program or project content selection process. Varying somewhat, respondents reported that the extent to which content leads to student achievement of program objectives was a factor of "Primary" influence in 48.8 percent of the programs and projects included in the study.

In summary, the data presented in Table V indicate that teachers working in a given program or project (81.1 percent) were "Primarily" involved in the content selection process in a greater percentage of the programs than any other group. Program or project directors or coordinators (59.1 percent) and the students participating in the program (45.2 percent) placed a rather distant second and third. Student interest (64.1 percent), the personal and social needs of the students (63.8 percent), and teacher interest (62.8 percent) were the factors exerting a "Primary" influence on content selection in the largest percentage of the programs and projects (Table VI). Conversely, the availability of a state adopted environmental education textbook (86.7 percent) and legislative mandate (81.4 percent) were the two factors exerting "No Influence" on content selection in the largest percentage of the programs and projects in the study population.

Curricular Organization

All questionnaire recipients were requested to indicate whether the curricular organization of their program or project was disciplinary, cross-dis-

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ciplinary, multidisciplinary, or interdisciplinary in nature. Simultaneously, each respondent was requested to indicate the disciplines or subject areas from which content and subject matter were most often selected for their program. Tables VII and VIII summarize responses to these questions.

Data describing respondents' descriptions of the organizational nature of their program or project curriculum are presented in Table VII. A large percent (73.4) of the program and project directors responding described their curricular organization as multidisciplinary or interdisciplinary. Another 23.6 percent reported their programs to be cross-disciplinary, while a surprisingly small percentage (2.0 percent), indicated a disciplinary orientation.

The extent of usage of various disciplines and subjects as sources of content and subject matter (Table VIII) indicate the subject most used as a source of content and subject matter was Biology. Two hundred seventy-seven or 92.0 percent of the respondents reported the "Often" use of Biology as a content source. The only other subject approaching this percentage of usage was Geology with 70.1 percent reporting it as an "Often" used source for content and subject matter.

More than six of every ten respondents indicated Geography, Math and History as "Often" used content and subject matter sources. Slightly over half of the directors and coordinators reported Art, Language Arts, Economics, and Sociology as "Often" used sources of curriculum content. Interestingly, Chemistry (47.5 percent) and Physics (28.6 percent) fall considerably below the percentage uses of Biology and Geology. Aside from Political Science (39.2 percent), Fine Arts (37.6 percent), and Physical Education (36.9 percent), no other subject or discipline was reported as being used as a source of content and subject matter by more than 28.6 percent of the study population. Consistent with the low "Influence" rating of Religion as a program or project justification, only 6.6 percent of the population indicated its use as a content source.

Information shown in Table VIII indicate an extremely low percentage use figure for the last six (Agriculture, Ecology, Home Economics, Voc/Tech, General Science, and Health) disciplines and subjects given. It must be noted that these were not included as solicited responses on the original questionnaire, but were responses to the "Other" category which were written in by respondents. Consequently, some caution should be exercised in interpreting the percentage use of these disciplines and subjects.

Sources of Instructional Materials

Questionnaire recipients were requested to indicate the degree to which each of a selected list of possible sources of instructional materials constituted such sources for their programs and projects. Table IX summarizes the responses to these items.

Materials developed by the teaching staff constituted the "Primary" source of instructional materials in 82.1 percent (247) of the programs and projects (Table IX). Two other sources, materials from various resource agencies and a combination of commercial and teacher prepared materials, were reported as "Primary" sources by four of every ten respondents. No other source was reported as "Primary" by more than 31.9 percent of the directors and coordinators responding to the instrument.

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One hundred eighty-two (60.5 percent) of the respondents indicated that a published textbook representing a single discipline was "Not a Source" of instructional materials. Similarly, the responses indicated that published textbooks representing two or more disciplines were "Not a Source" of instructional materials in 53.2 percent of the programs and projects. A single published environmental education curricular program was indicated "Not a Source" for 57.1 percent of the study population.

Approximately half of the directors and coordinators reported that materials provided by the State Education Agency (51.5 percent) and those developed by a school-wide or system-wide committee (48.5 percent) were "Not a Source" of instructional materials. Interestingly, materials developed by students were "Primary" sources in only 23.6 percent of the responding programs and projects, while the mass media was reported as a "Primary" source in only 20.9 percent of the cases.

A summary, shown in Table IX, reveals that the "Primary" source of instructional materials in more than eight out of every ten programs and projects responding was the materials developed by the teaching staff. On the contrary, a published textbook representing a single discipline was listed as "Not a Source" of instructional materials by more than 60.0 percent of the study population. Materials provided by the State Education Agency, published textbooks representing two or more disciplines, and a single published environmental education curricular program were listed as "Not a Source" of instructional materials by over half the directors and coordinators responding.

Instructional Strategies

All respondents were requested to indicate whether each of a list of instructional strategies was used "Often", "Rarely", or "Never" in their respective programs or projects. Table X presents data summarizing the responses to these items.

Small group projects, class discussions, and field trip/community resource visits were the strategies used "Often" in the largest percentage of programs and projects. Respondents reported "Often" use of these strategies in more than 80 percent of the programs and projects. Two hundred and thirty or 76.4 percent of the respondents indicated that individualized activities were used "Often" in their programs and projects.

Six other strategies (simulation activities/games, teacher/pupil planning, independent study projects, classroom visits from resource personnel, laboratory activities, and open-ended; problem solving approaches) were listed as "Often" used by between 51.2 and 68.4 percent of the directors and coordinators responding (Table X). No other strategy was described as such by more than 39.2 percent (learning centers) of the respondents.

Two hundred thirty-five or 78.1 percent of the respondents indicated that computer assisted instruction was "Never" used as an instructional strategy in their respective program or project. Additionally, programmed learning and behavior/performance contracts were "Never" used as instructional strategies in 53.8 percent and 47.2 percent of the programs and projects in the study sample. Aside from audio-tutorial activities which were reported as "Never" used by 35.5 percent of population, no other instructional strategy was reported as "Never" used by greater than 25.6 percent of the questionnaire respondents.

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In summary, the data presented in Table X show that small group projects, class discussions and field trip/community resource visits were "Often" used instructional strategies in the largest percentage of programs and projects. Conversely, there were indications that computer assisted instruction, programmed learning and behavior/performance contracts were the instructional strategies "Never" used in the largest percentage of programs and projects.

Staff Utilization/Organization

Table XI presents information describing the staff utilization and organization of the programs and projects included within the study population. Two hundred two or 67.1 percent of the respondents indicated that having various staff members serve as resource persons to assist in curriculum planning was the staff organizational and utilization strategy "Often" used in the largest percentage of cases. Conversely, having various staff members accept responsibility for independently teaching specific portions of the program was the strategy indicated by the smallest percentage (36.9 percent) of respondents as "Often" used. All other organization and utilization strategies listed were reported as "Often" used in slightly less than or slightly more than 50 percent of the programs and projects.

Interestingly, 55.1 percent of the respondents reported staff members working with a specific group of students in a self-contained classroom environment was an "Often" used organization and utilization strategy. Only 15.9 percent of the directors and coordinators responding indicated this strategy was "Never used.

Evaluation Metnodologies/Procedures

Responses to a series of questions describing whether selected evaluation methodologies and procedures were used "Often", "Rarely" or "Never" in their respective programs and projects are presented in Table XII.

Seven of every ten respondents reported their program was "Often" evaluated internally by program personnel. One hundred thirty (43.2 percent) respondents indicated that formal evaluation following a prescribed evaluation plan was "Often" used in their program or project, while slightly over half (50.5 percent) of the directors and coordinators indicated that informal evaluation following no predetermined evaluation design was "Often" used. Interestingly, only 27.9 percent of the respondents reported that external evaluation by nonprogram personnel was used "Often" in their program or project. Conversely, 32.2 percent reported this procedure was "Never" used. "Often" use of a combination of internal and external evaluation procedures was reported by 39.5 percent of the respondents, while almost half (49.2 percent) of the subjects reported "Often" usage of a combination of formal and informal evaluation techniques.

More than six of every ten respondents reported "Often" use of procedures to determine if the stated program objectives had been achieved. Another 22.3 percent indicated "Rare" use of such procedures. Thirty-five or 11.6 percent reported they "Never" used these evaluative procedures.

Sixty-eight and sixth-tenths percent of the respondents reported observed changes in student behaviors were "Often" used as an index to evaluate the effectiveness of their program or project on participants. Only 4.7 percent reported that such observed changes were "Never" used as an index to evaluate program or project effectiveness.

More than eight of every ten respondents used the term "Often" to describe evaluation procedures which were directed at program improvement. A slightly smaller number, 69.4 percent, reported that evaluation procedures were "Often" used which were directed at curriculum revision.

In regard to the extent to which students were evaluated on the basis of their performance compared to a class or group average, 25.6 percent of the respondents indicated "Often" and 29.6 percent "Rarely". Another 38.9 percent reported that such procedures were "Never" used in their programs or projects.

Data in Table XII indicate that 74.1 percent of the programs and projects "Often" make provisions for evaluating students in the area of attitude development and change, while 62.8 percent of the respondents indicated likewise for the area of cognitive knowledge. Slightly over half (54.2 percent) reported that provisions were "Often" made to evaluate students in the area of skill development.

Almost 42 percent of the participants reported that students were "Often" evaluated on the basis of their performance compared to prespecified performance objectives. Nearly 20 percent indicated that such procedures were "Never" used in their programs or projects.

Teacher evaluation of students was used "Often" in 70.1 percent of the programs. Student self-evaluation and cooperative student-teacher evaluation were reported as being "Often" used in better than four of every ten programs and projects. Interestingly, student peer evaluation was used "Often" in only 15.6 percent of the programs and projects and "Rarely" used in 37.5 percent. Another 37.5 percent of the respondents indicated they "Never" used student peer evaluation designs.

The evaluation strategies "Often" used in the largest percentage of the programs and projects were accomplishments related to problem resolution (50.5 percent), questionnaires (47.5 percent), and openended self-reports (46.8 percent). Anecdotal records (24.9 percent), interviews (38.9 percent), standardized tests (18.6 percent), and attitude scales (24.6 percent) were reported as "Often" used by 38.9 percent or less of the respondents. The strategies reported as "Never" used by the largest number of respondents were standardized tests (47.2 percent), anecdotal records (35.2 percent), and attitude scales (34.6 percent).

Curriculum Development Constraints

The extent to which a selected list of factors served as constraints to the development of environmental education curricula was investigated by one section of the questionnaire. Respondents were requested to indicate whether each of a list of factors were "Primary", "Secondary", or "Not" constraints to the development of curricula in their program or project (Table XIII).

The constraints felt to be "Primary" in the largest number of programs were inadequate funding at all levels and lack of time to develop curricula. One hundred or 33.2 percent of the respondents felt inadequate funding to be a "Primary" constraint, while 30.6 percent responded similarly for lack of sufficient time to develop curricula. Closely following insufficient funding and inadequate curriculum development time as "Primary" constraints was inadequate teacher training. Ninety respondents (29.9 percent) reported inadequate preservice training to be a

"Primary" constraint, while 25.9 percent felt likewise concerning in-service teacher training. The only additional constraint reported as "Primary" in greater than 20 percent of the programs and projects was lack of communication between the disciplines.

Somewhat contradicting the literature in the field, 61.8 percent of the respondents reported the lack of a generally accepted definition of environmental education as "Not a Constraint" to curriculum development. Similarly, the lack of available appropriate expertise was not perceived as a constraint by 62.1 percent of the respondents.

Again, somewhat contradictory to perceptions gleaned from the literature, 54.5 percent of the respondents reported confusion as to what environmental education curricula should encompass was not a barrier to curriculum development in their program or project. In a closely related response, 47.2 percent of the respondents indicated they did not feel a lack of appropriate curriculum materials for teaching environmental education constituted a developmental constraint.

When the "Primary" and "Secondary" percentages were summed, the data indicate that inadequate leadership at local, state and national levels was perceived as a constraint of some degree by approximately 40 percent of the directors and coordinators responding. Only 6.4 percent of the respondents felt the current spin-offs from the energy crisis constituted a "Primary" constraint, while 57.5 percent did not even feel it warranted constraint status.

Finally, two barriers, the lack of a political or legislative mandate and unacceptance of environmental education by teachers, were reported as not being constraints in approximately half of the programs and projects included in the study population. Conversely, 15.6 percent felt the lack of a political or legislative mandate was a "Primary" constraint, while only 10.3 percent responded likewise concerning the willingness of teachers to accept environmental education.

ANALYSIS OF SOCIOCULTURAL DIFFERENCES

Program justifications, objectives, sources of instructional material and instructional strategies were analyzed to determine if there were significant differences among programs and projects which were urban, suburban and rurally oriented. A Chi-square analysis with the .05 level of acceptance was used. Tables providing this data are not included in this study synopsis.

Program/Project Justifications

Only the "Historical" and "Aesthetic" justifications were found to be significant at the .05 level. The "Historical" justification was less of a "Primary" influence in urban oriented programs than suburbanly or rurally oriented programs; a greater "Secondary" influence in urbanly oriented than suburbanly or rurally oriented programs; and was "Not an Influence" more so in suburbanly than in urbanly and rurally oriented programs. Data also indicate the "Aesthetic" justification to be less of a "Primary" influence in urbanly oriented programs than in those with suburban or rural orientations; and "Not an Influence" more so in suburban programs than in urban or rural programs.

Program/Project Objectives

Responses to the questionnaire section investigating the objectives of pro-

grams and projects were analyzed to determine if there were significant differences among urban, suburban and rural orientations at the .05 level of acceptance. A Chi-square statistical analysis was utilized in analyzing the responses.

Objective 5, concerned with analyzing the role of contributing factors (technology, legislation, etc.) to the causes of environmental education, was the only objective found significant at the .05 level. The only other objective approaching the necessary Chi-square value of 9.49 (4 df) for significance was objective 18 which dealt with the development of a positive self image about the environment.

"Analyzing the role of contributing factors (technology, legislation, etc.) to the causes of environmental problems" was more of a "Primary" objective in suburban than in urban or rural programs and projects. Furthermore, this same objective was less of a "Secondary" objective in suburban programs than in those with urban or rural orientations. No inference could be established concerning the extent to which this objective was "Not an Objective" in urban, suburban or rural programs.

Sources of Instructional Materials

Sources of instructional materials used in programs and projects included in the study population were analyzed to determine if significant differences existed among the three sociocultural program orientations.

Comparison of urban, suburban and rural program and project director and coordinator response to Items 4 and 5 yielded the largest Chi-square values. Nevertheless, these values were somewhat below the 9.49 (f df) necessary for significance at the .05 level. As a point of interest, it should be noted that Chi-square values ranged from a 0.97 on Item 3 to 7.96 on Item 5. No item concerning the differences in the sources of instructional material among urban, suburban and rural program orientations was found to be significant at the .05 level.

Instructional Strategies

Statistical analyses were conducted to determine if there were significant differences among urban, suburban and rural programs and the extent of usage of the list of 22 instructional strategies listed in Table X. The data indicated only Item 16 (Behavior/Performance Contracts) was significant at the .05 level.

Item 16 indicated that Behavior/Performance Contracts were used "Often" to a lesser extent in rural programs. Furthermore, the data also indicated a greater degree of "Rare" usage in rural programs and the nonuse of Behavior/Performance contracts more so in urban and suburban than in rural programs.

ANALYSIS OF PROGRAM TYPE DIFFERENCES

Program and project justifications, instructional strategies, staff utilization and organization procedures and curricular organization were analyzed to determine if there were significant differences among elementary, secondary and combined programs. A Chi-square analysis with the .05 level of acceptance was utilized.

15.

Program/Project Justification

Responses to questionnaire Section III, which investigated the degree of influence of various justifications for environmental education on the total justification of the programs and projects included in the study population, were analyzed to determine if there were significant differences among elementary secondary, and combined program types.

Six justifications were found to be significant at the .05 level. Analysis of the data indicated that a "Historical" justification was less of a "Primary" influence on program justification in an elementary than a secondary or combined program. Additionally, these same data show that a "Historical" justification was more of a "Secondary" influence in elementary and combined programs. Finally, the "Historical" justification purports to be "Not an Influence" in more elementary and secondary programs than in those having a combined orientation.

Concerning the influence of the "Techno-Scientific" justification, the data suggested it was a greater "Primary" influence in secondary and combined programs, while it is somewhat of a larger "Secondary" influence in secondary level programs. Furthermore, the data indicate this justification to be "Not an Influence" more so in elementary programs than in secondary or combined programs.

As with the "Techno-Scientific" justification, the data show the influence of a "Philosophical" justification on program and project rationales was less of a "Primary" influence in elementary programs. Similarly, it also appears to be "Not an Influence" more often in these same programs. However, the "Philosophical" justification was reported to be more of a "Secondary" influence in secondary and combined programs.

Data pertaining to the differences among program types relative to the "Rural-to-Urban" justification indicate it to be a "Primary" influence more often in combined programs than in secondary or elementary oriented approaches. Furthermore, the data also indicate a "Primary" influence in a greater percentage of secondary than elementary programs. Seemingly, an inverse relationship is indicated by the data related to the "Not an Influence" category. The data do not support any interpretation as to the degree of "Secondary" influence this justification had.

The high Chi-square value (26.88) associated with the "Problem-Solving" justification indicates the existence of significant differences among the program types. Accordingly, the data indicate a "Problem-Solving" justification as being less of a "Primary" influence in elementary programs while, at the same time, indicating it to be "Not an Influence" in a greater percentage of programs at this level.

As with the "Problem-Solving" justification, the high Chi-square value (45.50) for the differences among programs related to the "Political" justification indicates the existence of significant differences. The data indicate the "Political" justification to be less of a "Primary" and "Secondary" influence on the development of a total program justification in elementary programs. Remaining consistent, these data also indicate a somewhat higher percentage for this justification to be "Not an Influence" in elementary programs.

16.

Interestingly, the analysis revealed only one other justification which approached the acceptable significance level. A Chi-square value of 8.75 was reported for the "Educational" justification, however, this value was slightly below that needed for significance at the .05 level.

Instructional Strategies

Section VII of the study questionnaire was designed to investigate the extent to which selected instructional strategies were utilized in public school environmental education programs and projects. Responses to these items were analyzed to determine if there were significant differences in the degree to which each of these strategies was utilized in elementary, secondary or combined programs. Eleven of the 22 strategies were found to have significant differences. However, due to the existence of empty contingency table cells, the significant Chi-square values for small group projects and field trip/community resource visits were not addressed in the analysis. The data indicate seminars were used less "Often" in elementary programs. Consistently, there is also an indication of "Rare" use of this strategy in more elementary and combined programs than in those with a secondary level population. Additionally, the data show that seminars were "Never" used as instructional strategies less in combined programs and more in elementary programs than in secondary programs.

Role playing was used less "Often" and "Rarely" as an instructional strategy in secondary programs than in elementary or combined programs. Furthermore, the data also indicate a greater "Never usage of this strategy at the secondary level.

The Chi-square value of 24.71 reported for simulation activities/games indicates a high degree of significance among program types and the greater "Often" use of this strategy in elementary and combined programs as opposed to a lesser degree of "Rare" usage at these same levels. Secondary level programs, according to the data, seem to "Never" use this strategy more so than other program types.

Item 9 reveals a less "Often" use of panel discussions as an instructional strategy in the elementary grades. Similarly, the data indicate a lesser degree of "Rare" use of this strategy in combined programs. Elementary programs also exhibit a greater inclination to "Never" use panel discussion as an instructional strategy.

Independent study projects were more "Often" used in secondary and combined programs than in those with strictly an elementary orientation. They also were reportedly "Rarely" used and "Never" used more so at the elementary level.

Combined programs utilized classroom visits from resource personnel more "Often" than other program types. Secondary programs used this strategy more "Rarely" than elementary or combined programs. Large group instruction as an instructional strategy was "Rarely" used less often in secondary oriented programs. This strategy was "Never" used to a lesser extent in elementary and combined programs than in those which involved only secondary level students.

The Chi-square value of 32.27 reported for learning centers indicates a

17.

high level of significance for this item. "Often" as a descriptor referring to the use of learning centers as an instructional strategy, appears to be somewhat greater in elementary and combined programs. A greater "Rare" and "Never" usage of this strategy at the secondary level also is indicated.

An analysis of the final strategy, values clarification activities, to be discussed under this section indicate a relatively high degree of significance. Combined programs use this strategy more "Often" than others, while secondary programs "Never" use such activities to a greater extent than elementary and combined programs.

In summary, significant differences were reported and discussed for nine of the instructional strategies. Only two other strategies, computer assisted instruction and teacher/pupil planning, approached the level necessary for significance. No other significant differences were reported at the .05 level.

Staff Utilization/Organization

Staff utilization and organization procedures and methodologies as reported by the respondents were analyzed to determine if there were significant differences among elementary, secondary and combined programs. Significant differences were reported for six of these procedures and methodologies among the three types of programs.

Having various members of the staff accept responsibility for independently teaching specific portions of the program was less "Often" used in programs with a secondary orientation. There is an indication that a somewhat greater percentage of secondary programs "Never" use this type of staff organization. The data indicate a similar situation in regard to the staff operating as a team. Findings show that a lesser percentage of secondary programs, than elementary or combined programs, operated with the staff as a functional team. As described before, a larger percentage of secondary programs "Never" used this organization.

The utilization of various staff members as resource persons to assist in curriculum planning was indicated as being more "Often" the practice in elementary and combined programs. Similarly, lesser degrees of "Rare" and "Never" usage were indicated for programs with a secondary orientation.

Concerning the use of appropriate staff members to serve as guest lecturers, guests, etc., there was an indication that this procedure was utilized less in secondary programs than in those with elementary or combined orientations. Furthermore, this organization was used less "Rarely" in combined programs, and "Never" to a greater extent in secondary programs.

Data for Item 7 (Staff works with volunteers) indicates more "Often" use of this procedure in elementary and combined programs. Conversely, a greater percentage of secondary programs "Never" using such a procedure is indicated.

The final item considered in this section was the procedure in which the staff trains regular teachers to conduct the entire program. This procedure was used "Often" to a lesser extent in secondary programs than in others. As previously stated, this procedure was "Never" used in more secondary programs than in elementary or combined programs.

Curriculum Organization

Responses to the questionnaire section investigating curriculum organization and the extent to which a selected list of disciplines and subjects were used as sources of content were analyzed to determine if there were significant differences among elementary, secondary, and combined programs.

An analysis was made relative to possible differences that might exist among the program types in the disciplines or subjects used as sources of content and subject matter. Significant differences at the .05 level of acceptance were reported in 15 instances.

Anthropology, Geography, Art, History, Language Arts, Mathematics, Physical Education, and Fine Arts (music, drama) were used as sources of curriculum content and subject matter less "Often" in secondary programs than in those with an elementary or combined orientation. Moreover, these same data imply that Biology, Physics, Political Science, Sociology and Chemistry, were content sources less "Often" in elementary programs than in secondary or combined approaches. An additional indication was that General Science and Ecology were used more "Often" as content sources in elementary programs.

In summary, curricular organization in elementary, secondary and combined schools indicate a calculated Chi-square value of 8.12 (6 df). This value was below the value of 12.59 necessary for significance at the .05 level of acceptance.

ANALYSIS OF FINANCIAL SUPPORT DIFFERENCES

Responses to questionnaire sections investigating program justifications, curriculum organization, instructional strategies, and staff organization and utilization procedures were analyzed to determine if there were significant differences among programs and projects which were locally, state or federally funded. A Chi-square analysis with the .05 level of acceptance was used.

Program/Project Justification

Responses from survey respondents whose programs or projects received 60 percent or more of their funding from local, state or federal sources were analyzed to determine if there were significant differences relative to the degree that a specified list of possible program and project justifications influenced development of the total justification for their program or project.

Only one justification was shown to be significant at the .05 level. A Chi-square value of 12.85 (4 df) for "Economic" justification was well above the 9.49 value required for significance at the .05 level. A closer examination of this justification indicates that an "Economic" justification was a "Primary" influence on the development of total project justification less "Often" in locally funded programs than in those funded primarily from state or federal sources. Similarly, an "Economic" justification tended to be "Not an Influence" more so in locally funded programs. As a point of interest, the reader should note that aside from 8.74 Chi-square value obtained for the "Political" justification, the majority of the remaining Chi-square values were quite low.

Curricular Organization

Responses to Section X of the questionnaire investigating the curricular organization of the programs and projects were analyzed to determine if there were significant differences among local, state and federally funded programs. Aspects of curriculum organization investigated included the role of the disciplines and the extent to which selected disciplines and subjects were used as sources of content in the population programs and projects.

The list of disciplines and subjects provided in Table VIII were analyzed for significant differences according to funding sources. Only Physical Education was found to be significant at the .05 level. Physical Education indicated a greater nonuse as a source of content and subject matter in federally funded programs. Concurrently, the data also imply more of an "Often" use of Physical Education in programs funded from state sources.

Although, only one item was significant at the .05 level, the reader should note that Biology and Art have Chi-square values approaching that (5.99) necessary for significance at the .05 level with 2df. Furthermore, a Chi-square of 7.55 is reported for Ecology, however, zero cell frequencies make analysis inappropriate.

An analysis of the role of the disciplines in curriculum organization indicated a Chi-square value well below that necessary for significance at the .05 level (6 df).

Instructional Strategies

Respondent replies concerning the extent to which a selected list of instructional strategies were used in study programs and projects were analyzed to determine if there were significant differences according to the source of program funding.

Significant differences at the .05 level were reported for role playing and values clarification as instructional strategies in local, state and federally funded programs. With respect to role playing, the data indicate less "Often" use of this activity as an instructional strategy in locally funded programs. Role playing was "Rarely" used as an instructional strategy in a greater percentage of locally funded programs.

Values clarification activities were used "Often" in a larger percentage of state funded programs. At the same time, these data also suggest "Rare" usage of values clarification activities in a greater number of locally funded programs than in those receiving their fiscal support from state or federal sources. No other reported Chi-square value approached that required for significance at the .05 level.

Staff Utilization/Organization

A selected list of program and project staff organization and utilization methodologies and procedures were analyzed to determine if there were significant differences among local, state and federally funded programs.

No staff organization and utilization strategy was found to be significantly different at the .05 level. It is noteworthy, however, that the Chi-square values for items 2 (Various members of the staff accept responsibility for teaching specific portions....) and 6 (Appropriate staff members serve as guest lecturers, experts, etc.) closely approach the value of 5.99 required for significance at that level.

CURRICULUM DEVELOPMENT CONSTRAINTS -- ANALYSIS OF DIFFERENCES

Responses to Section VI of the questionnaire, investigating the degree to which a selected list of factors constituted barriers to curriculum development in environmental education, were analyzed to determine if significant differences existed among the sociocultural orientations, program types by grade level grouping, and the sources of funding for programs and projects.

Program Type Analysis

Results of the analysis of constraints by program type indicate significant differences at the .05 level for inadequate leadership at the state level and lack of time to develop curriculum.

Data reported for Item 12 indicate that inadequate leadership at the state level was considered "Not a Constraint" in a larger percentage of elementary programs. Concerning the lack of time to develop curricula in environmental education, the data indicate this was more of a "Primary" constraint in secondary programs than in those with an elementary or combined orientation. Furthermore, there was an indication that more elementary programs found this "Not" to be a constraint than did those with other orientations.

Although only the two items previously discussed were found to be significant at the .05 level, Item 2 (Lack of appropriate curriculum material for teaching environmental education) has a Chi-square value approaching that required for significance. No other Chi-square values approximate that necessary for significance.

Differences in Sources of Financial Support

An analysis of differences in curriculum development constraints according to sources of program funds indicated items 4, 9 and 16 to be significant at the .05 level.

With respect to inadequate funding at all levels, the study reveals that this is somewhat less of a "Primary" constraint in federally funded programs than in those garnering funds from state and local sources. Conversely, this same factor was reported as "Not" a constraint more so in programs and projects receiving 60 percent or more of their funding from federal sources.

Inadequate evaluation of past and present efforts in environmental education was more of a "Primary" constraint in state funded programs. Conversely, the data also indicated a greater percentage of locally and federally funded programs perceiving inadequate evaluation as "Not" a constraint to curriculum development.

Item 16 (Lack of a political or legislative mandate) was reported as somewhat more of a "Primary" constraint in locally funded programs. Furthermore, this lack of political and legislative action was a somewhat greater "Secondary" constraint, and to a lesser degree, "Not" a constraint in programs funded primarily from state sources. No other Chi-square value approaches that necessary for significance at the .05 level.

Sociocultural Differences

Applicable participant responses were analyzed to determine if there were significant differences as to the constraints to environmental education curriculum development in urban, suburban and rural schools. Item 14 (Lack of time...) was the only item reported as significant at the .05 level.

Lack of time to develop curricula was reported as somewhat less of a "Primary" constraint in urban programs and somewhat more of a "Secondary" constraint in urban and rural programs. Additionally, only Item 3 had a Chi-square value approaching the 9.49 necessary for significance.

CHAPTER IV

CONCLUSIONS

Analysis of the data collected during the process of this study provided sufficient evidence to warrant the following set of conclusions.

ANALYSIS OF CURRICULA

Grade Level Participation

Grade level involvement in public school environmental education programs and projects is greatest at the upper elementary (grades five and six) and senior high (grades ten, eleven and twelve) levels, and lowest in kindergarten. All other grades (e.g., one through four and seven through nine) are involved in slightly over half the programs and projects in the study population.

Program/project justification

Total program and project justifications evolve from a combination of influences exerted by many justifications. However, there is sufficient evidence to indicate that major influences in a majority of programs and projects are "Educational", and "Conservationist" justifications.

Program/project objectives

There is a clear indication that objectives focused on helping students become knowledgeable about their environment and its associated problems, and developing an appreciation of environmental resources, are considered of more importance in a majority of programs and projects than are those objectives focusing on helping students actually solve environmental problems and develop problem sloving skills.

Content selection process

(1) Teachers working in a given program or project have the primary involvement in the content selection process. State education agency personnel, local school parents, community representatives, and other school administrators have the least involvement in the content selection process.

(2) Student interest, the personal and social needs of the students, teacher interest, and local environmental problems and concerns are the factors exerting

the most influence on the selection of curriculum content. The availability of state adopted environmental education textbooks and legislative mandate provide the least amount of influence.

Curricular Organization

Multidisciplinary and interdisciplinary curricular organizations are in effect in a majority of programs and projects. Percentage-wise, a wide variety of disciplines and subjects serve as sources of content and subject matter. There was, however, sufficient evidence to indicate Biology and Geology are used as content and subject matter sources in a large majority of the programs and projects.

Sources of Instructional Materials

There is clear evidence that instructional materials are garnered from a wide variety of sources. Sufficient evidence is available to warrant the conclusion that materials developed by the teaching staff are the major source of instructional materials in a large majority of programs and projects. Similarly, published textbooks and materials from State Education Agencies are the least utilized sources.

Instructional Strategies

Public school environmental education projects and programs utilize a variety of instructional strategies. Small group projects, class discussions, and field trip/community resource visits are the most often used, while computer assisted instruction, programmed learning, and behavior/performance contracts are the least often utilized strategies for instruction.

Staff Utilization and Organization

No one dominating staff utilization and organization pattern in public school environmental education programs was identifiable. However, there was sufficient evidence to justify the conclusion that having various staff members serve as resource persons to assist in curriculum planning is used slightly more often than other staffing and organizational patterns.

Evaluation methodologies and procedures

Sufficient evidence was available to lead the investigator to conclude that:

1. Most programs and projects are evaluated primarily by internal program personnel.
2. Program and project evaluations are, for the most part, directed at program and instructional improvement.
3. Students are generally evaluated as to attitudinal development and change.
4. Teacher evaluation of students is the most widely practiced method of student evaluation.
5. A wide variety of specific evaluation strategies are utilized in student evaluation.

Curriculum development constraints

Inadequate funding at all levels and lack of time to develop curricula rank highest as constraints to environmental education curriculum development.

SOCIOCULTURAL DIFFERNCES

There is no clear evidence to indicate significant differences among the sociocultural (urban, suburban, rural) environments of the student populations served and the "justification, objectives, sources of instructional materials, and the instructional strategies" of public school environmental education program and project curricula.

PROGRAM TYPE DIFFERENCES

There are significant differences in the "justification, instructional strategies and staff utilization and organization procedures" among elementary, secondary and combined public school environmental education programs and projects. Concerning curricular organization, significant differences do exist relative to the discipline or subjects used as sources of content and subject matter in elementary, secondary and combined approaches. There are no significant differences in the curricular organization among elementary, secondary and combined public school programs and projects.

SOURCES OF FINANCIAL SUPPORT

There are no significant differences among the sources of financial support and the "justification, curricular organization, instructional strategies, and staff utilization and organization" of public school environmental education programs and projects.

CURRICULUM DEVELOPMENT CONSTRAINTS

There is no clear evidence to indicate the existence of significant differences in the constraints to environmental education curriculum development among programs with: (1) urban, suburban, and rural sociocultural orientations; (2) local, state and federal funding sources; and (3) elementary, secondary and combined grouping orientations.

IMPLICATIONS FOR FURTHER RESEARCH

Fundamental to any study are those questions raised which are not answered. The very nature of this study, combined with the realization that highly orgnaized efforts in environmental education are a relatively new area of human endeavor, and that very little research has occurred in the field, greatly facilitates the identification of areas needing further research. As a result, the following implications for further research are offered on the basis of the findings of this study.

1. In a very real sense, this study provides the beginnings of a data base describing the status of environmental education curricula in the nation's public schools. Equally important for curriculum planners and developers is that their efforts have justifiable directions. A discrepancy analysis comparing

"where we are" with "where we should be" could provide the directional emphasis needed so much within the field.

2. The viability and durability of any program is fundamentally related to its underlying justification. The rather wide range of responses obtained in this study suggests the need for additional investigation into this area using other research techniques, different populations and subpopulations, and varied time frameworks.

3. Supplementary findings of this study suggest public school environmental education to be primarily a white, middle class movement. Intensive research efforts should be undertaken to determine the extent to which minority groups and lower socioeconomic groups are actually involved in environmental education.

4. By definition, environmental education is, if not totally, at least to a large degree, problem focused. The finding of this study indicating that problem solving and problem focused objectives are of lesser importance than those focused on the knowledge and appreciation level, is somewhat disturbing. Investigation as to why this is so should merit much attention.

5. A closer look is needed into the evaluation methodologies and procedures used in public school programs and projects. One must seriously question past evaluative results when the data from this study indicate an overwhelming percentage of programs are most often evaluated internally by program personnel. Conversely, the effectiveness of external evaluative efforts merit the same type of scrutiny.

6. Significant differences in urban, suburban and rural program justifications were not found. However, the very wide distribution of Chi-square values reported would suggest this as a potentially fruitful area for further research.

7. Assuming explicit differences in urgan, suburban and rural student populations, the wide distribution of Chi-square values merits a closer look at curricular differences within these three program orientations.

8. Quite obviously, curricular differences exist between elementary, secondary, and combined program orientations. Research revealing the extent and the actual operational nature of these differences would contribute greatly to future curriculum development efforts within the field.

9. A study of this nature raises questions concerning the future of environmental education in general, and particularly within the public schools. Research efforts providing quantitative and qualitative insights into this area are nonexistent.

10. This study provides some preliminary data describing the constraints to environmental education curriculum development. An in-depth investigation could contribute much to remediating the constraining effect of many of these factors.

11. Serious questions are raised regarding the interest and ability of a wide range of local educational systems to organize, implement, and sustain long term environmental educational programs by the use of educational funds derived primarily from local sources.

TABLE I

GEOGRAPHIC DISTRIBUTION OF QUESTIONNAIRE RESPONSES

State	Questionnaire Total	Usable Responses	Nonrespondents	% Usable Responses	Program/ Project Not Applicable	Miscellan
Alabama	6	3	3	1.0	0	0
Alaska	3	1	1	0.3	1	0
Arizona	5	2	3	0.7	0	0
Arkansas	3	3	0	1.0	0	0
California	15	7	7	2.3	0	1
Colorado	16	9	5	3.0	1	1
Connecticut	6	4	1	1.3	0	1
Delaware	9	4	4	1.3	1	0
Florida	22	15	4	5.0	0	3
Georgia	7	6	0	2.0	1	0
Hawaii	9	4	4	1.3	1	0
Idaho	3	1	2	0.3	0	0
Illinois	37	16	19	5.3	0	2
Indiana	8	4	3	1.3	0	1
Iowa	11	6	5	2.0	0	0
Kansas	9	5	2	1.7	1	1
Kentucky	10	6	4	2.0	0	0
Louisiana	3	2	0	0.7	0	1
Maine	7	5	2	1.7	0	0
Maryland	26	8	15	2.7	2	1
Massachusetts	14	10	4	3.3	0	0
Michigan	11	4	6	1.3	1	0
Minnesota	9	5	4	1.7	0	0
Missouri	2	1	1	0.3	0	0
Mississippi	3	3	0	1.0	0	0
Montana	15	7	5	2.3	1	1
Nebraska	2	1	0	0.3	1	0
Nevada	3	0	2	0.0	1	0
New Hampshire	17	10	3	3.3	3	1
New Jersey	17	15	2	5.0	0	0
New Mexico	5	2	1	0.7	1	1
New York	8	3	4	1.0	1	0
North Carolina	11	8	3	2.7	0	0
North Dakota	2	0	2	0.0	0	0
Ohio	35	10	23	3.3	2	0
Oklahoma	9	6	3	2.0	0	0
Oregon	12	10	1	3.3	1	0
Pennsylvania	29	20	9	6.6	0	0
Rhode Island	11	8	3	2.7	0	0
South Carolina	5	2	1	0.7	1	1
South Dakota	2	0	0	0.0	0	2
Tennessee	12	10	2	3.3	0	0
Texas	6	4	2	1.3	0	0
Utah	15	8	5	2.7	0	2
Vermont	11	5	6	1.7	0	0
Virginia	15	7	7	2.3	1	0
Washington	13	10	1	3.3	2	0
Washington, D. C.	3	3	0	1.0	0	0
West Virginia	4	3	1	1.0	0	0
Wisconsin	14	10	3	3.3	1	0
Wyoming	6	5	1	1.7	0	0
Totals	536	301	190	100.0	25	20
% of Total	100	35.45	56.16		4.66	3.73

TABLE II

GRADE LEVEL INVOLVEMENT IN PROGRAMS/PROJECTS BY FREQUENCY AND PERCENTAGE—TOTAL POPULATION*

Grade Level	Participating		Not Participating	
	No.	%	No.	%
Kindergarten	134	44.5	167	55.5
Grade One	151	50.2	150	49.8
Grade Two	151	50.2	150	49.8
Grade Three	163	54.2	138	45.8
Grade Four	173	57.5	128	42.5
Grade Five	185	61.5	116	38.5
Grade Six	202	67.1	99	32.9
Grade Seven	168	55.8	133	44.2
Grade Eight	166	55.1	135	44.9
Grade Nine	171	56.8	130	43.2
Grade Ten	193	64.1	108	35.9
Grade Eleven	206	68.4	95	31.6
Grade Twelve	208	69.1	93	30.9

*N = 301.

TABLE III

PROGRAM/PROJECT JUSTIFICATIONS BY FREQUENCY AND PERCENTAGE - TOTAL POPULATION*

Program/Project Justification	Primary Influence		Secondary Influence		Not an Influence		Missing Observations	
	No.	%	No.	%	No.	%	No.	%
1. Conservationist Justification: Students must be taught the wise use and development of the Earth's limited supply of natural resources.	230	76.4	58	19.3	11	3.7	2	0.7
2. Historical Justification: Some historical evidence traces the downfall of major civilizations to the harmful effects of unwise environmental practices. National survival mandates that these practices be prevented and eliminated through effective educational programs.	63	20.9	144	47.8	91	30.2	3	1.0
3. Techno-scientific Justification: Scientific and technological progress, without corresponding political, economic, and educational advances, produces a society cluttered with physical change. Environmental education promotes the best use of these advancements.	78	25.9	156	51.8	63	20.9	4	1.3
4. Philosophical Justification: The major intent of environmental education is in perfect accord with the basic philosophical premise of American democracy and liberty: that every citizen be a participant in governing. Environmental education encourages environmental considerations in this process.	106	35.2	125	41.5	68	22.6	2	0.7
5. Ethical Justification: Traditionally, man's relationship to man (e.g., it is unethical for man to behave in such a way that he threatens the welfare of the entire society; man has a responsivility to posterity, etc.) has been an important component of public education. Environmental education fosters the development of ethical environmental standards.	170	56.5	107	35.5	21	7.0	3	1.0
6. Religious Justification: Biblically, man is charged with the responsibility for safeguarding the Earth's resources. Environmental education promotes development of this responsibility.	31	10.3	86	28.6	181	60.1	3	1.0
7. Sociological Justification: Societal needs relating to environmental problems imply a major cultural reeducation. Environmental education promotes the development of the beliefs, values and convictions necessary to meet these needs.	148	49.2	126	41.9	22	7.3	5	1.7

TABLE III (Continued)

Program/Project Justification	Primary Influence		Secondary Influence		Not an Influence		Missing Observations	
	No.	%	No.	%	No.	%	No.	%
8. Educational Justification: Traditionally, education has served to equip citizens with the knowledge and understanding needed to make decisions and take action. Environmental education is a key to solving society's pressing environmental problems.	237	78.7	56	18.6	6	2.0	2	0.7
9. Ecological Justification: If "everything is connected to everything else," we need to learn to respect the relationships of interdependent social and biological systems. Environmental education promotes such understandings.	266	88.4	31	10.3	3	1.0	1	0.3
10. Preservationist Justification: The Earth's supply of natural resources is limited. Therefore, students must be taught the responsibility to preserve them in their present state.	150	49.8	100	33.2	47	15.6	4	1.3
11. Relevance Justification: Education is relevant when it deals with human life—either the conditions which sustain life or the conditions which give life meaning. Environmental education is relevant education.	182	60.5	94	31.2	22	7.3	3	1.0
12. Rural-to-Urban Justification: Classical conservation education is not fulfilling the needs emerging from increasing rural-to-urban migration. Environmental education meets these needs by encompassing the total environment, its associated problems, and the role of man.	98	32.6	116	38.5	84	27.9	3	1.0
13. Problem-Solving Justification: Solving the widespread environmental problems which are threatening our present forms of life as well as future development, insures a high quality of life. Environmental education teaches this problem solving process.	151	50.2	120	39.9	25	8.3	5	1.7
14. Political Justification: Solutions to environemntal problems many times require an understanding and utilization of political processes. Environmental education develops these understandings and promotes involvement through appropriate political channels.	85	28.2	136	45.2	75	24.9	5	1.7
15. Economic Justification: Financial support was available for environmental education. As long as funds are available, there will be environmental education programs.	49	16.3	95	31.6	153	50.8	4	1.3
16. Aesthetic Justification: The natural beauty of the Earth is being destroyed by uncontrolled environmental destruction. Environmental education promotes the maintenance of an aesthetically pleasing environment.	177	58.8	96	31.9	25	8.3	3	1.0

*N = 301.

TABLE IV

PROGRAM/PROJECT OBJECTIVES BY FREQUENCY AND PERCENTAGE -- TOTAL POPULATION*

Program/Project Objectives	Primary Objective		Secondary Objective		Not an Objective		Missing Observations	
	No.	%	No.	%	No.	%	No.	%
1. Become knowledgeable concerning their total environment (biological, physical, social, cultural, and economic, etc.) and its associated problems.	264	87.7	31	10.3	4	1.3	2	0.7
2. Understand the importance of the environment in providing for human needs as well as those of other organisms.	233	77.4	65	21.6	1	0.3	2	0.7
3. Interpret their individual and social roles as they relate to environmental problems (political, social, etc.).	167	55.5	123	40.9	10	3.3	1	0.3
4. Apply environmental stewardship concepts in their daily living patterns.	199	66.1	95	31.6	6	2.0	1	0.3
5. Analyze the role of contributing factors (technology, legislation, etc.) to the causes of environmental problems.	110	36.5	157	52.2	33	11.0	1	0.3
6. Synthesize various alternative solutions to environmental problems into a comprehensive plan.	70	23.3	158	52.5	71	23.6	2	0.7
7. Evaluate how varying value systems modify and shape the use of the environment.	102	33.9	144	47.8	52	17.3	3	1.0
8. Work directly with environmental problem solving.	131	43.5	127	42.2	40	13.3	3	1.0
9. Develop proficiency in environmental data collecting techniques.	92	30.6	137	45.5	70	23.3	2	0.7
10. Develop skills in identifying and defining environmental problems.	147	48.8	132	43.9	18	6.0	4	1.3
11. Become aware of their biophysical environment and its associated problems.	200	66.4	90	29.9	10	3.3	1	0.3
12. Recognize the need for man to correct environmental abuses.	214	71.1	82	27.2	4	1.3	1	0.3
13. Develop an appreciation for their environmental resources.	252	83.7	42	14.0	5	1.7	2	0.7
14. Develop a sensitivity to their own role and responsibility in developing a productive and liveable environment.	225	74.8	70	23.3	5	1.7	1	0.3
15. Develop a positive environmental ethic.	222	73.8	69	22.9	9	3.0	1	0.3
16. Motivate students to investigate and attempt to solve environmental problems.	171	56.8	116	38.5	10	3.3	4	1.3
17. Develop an environmental concern that results in a commitment to remedial and preventative action.	154	51.2	126	41.9	19	6.3	2	0.7
18. Develop a positive self image about the environment.	203	67.4	81	26.9	13	4.3	4	1.3

*N = 301.

TABLE V

INVOLVEMENT IN CONTENT SELECTION PROCESS BY FREQUENCY AND PERCENTAGE—TOTAL POPULATION*

Participant	Primary Involvement		Secondary Involvement		No Involvement		Missing Observations	
	No.	%	No.	%	No.	%	No.	%
1. Students participating in the program or project.	136	45.2	126	41.9	32	10.6	7	2.3
2. Teachers working in the program.	244	81.1	48	15.9	3	1.0	6	2.0
3. Environmental education program director, project director or coordinator.	178	59.1	84	27.9	33	11.0	6	2.0
4. Community representatives (business, industrial, etc.).	32	10.6	142	47.2	118	39.2	9	3.0
5. Representatives from cooperating resource agencies (Examples: Soil Conservation Service, National Park Service, etc.).	62	20.6	172	57.1	61	20.3	6	2.0
6. Consultants representing varied disciplinary fields.	48	15.9	150	49.8	95	31.6	8	2.7
7. State education agency personnel.	26	8.6	128	42.5	139	46.2	8	2.7
8. School administrators other than the environmental education program director, project director or coordinator.	43	14.3	132	43.9	119	39.5	7	2.3
9. Local school parents.	27	9.0	133	44.2	131	43.5	10	3.3

*N = 301.

TABLE VI

FACTORS INFLUENCING THE SELECTION OF PROGRAM/PROJECT CONTENT BY FREQUENCY AND PERCENTAGE -- TOTAL POPULATION*

Factors	Primary Influence		Secondary Influence		Not an Influence		Missing Observations	
	No.	%	No.	%	No.	%	No.	%
1. The personal and social needs of the students.	192	63.8	79	26.2	14	4.7	16	5.3
2. Student interest.	193	64.1	86	28.6	6	2.0	16	5.3
3. Teacher competencies.	129	42.9	128	42.5	27	9.0	17	5.6
4. A state environmental education plan or curriculum guide.	20	6.6	94	31.2	171	56.8	16	5.3
5. A commercially prepared environmental education program.	6	2.0	59	19.6	220	73.1	16	5.3
6. Local environmental problems and concerns.	176	58.5	102	33.9	9	3.0	14	4.7
7. A locally prepared environmental education curriculum guide.	114	37.9	55	18.3	117	38.9	15	5.0
8. Beliefs based on how students learn.	156	51.8	103	34.2	26	8.6	16	5.3
9. Availability of a state adopted textbook dealing with environmental education.	1	0.3	25	8.3	261	86.7	14	4.7
10. Legislative mandate.	6	2.0	35	11.6	245	81.4	15	5.0
11. Predetermined behavioral or performance objectives.	61	20.3	107	35.5	117	38.9	16	5.3
12. Adherence to guidelines associated with applications for financial support.	43	14.3	59	19.6	184	61.1	15	5.0
13. Teacher interest.	189	62.8	90	29.9	8	2.7	14	4.7
14. The extent to which content leads to student achievement of program objectives.	147	48.8	103	34.2	31	10.3	20	6.6
15. Locally adopted materials already in the schools.	46	15.3	90	29.9	150	49.8	15	5.0

*N = 301.

TABLE VII

PROGRAM/PROJECT CURRICULUM ORGANIZATION—
TOTAL POPULATION*

Curriculum Organization	Frequency	Percentage
1. Disciplinary	6	2.0
2. Cross-disciplinary	71	23.6
3. Multidisciplinary	112	37.2
4. Interdisciplinary	109	36.2

*N = 298.

TABLE VIII

DISCIPLINES AND SUBJECTS FROM WHICH CONTENT
AND SUBJECT MATTER ARE MOST OFTEN
SELECTED—TOTAL POPULATION*

	Used Often		Not Used		Missing Observations	
Discipline/Subject	No.	%	No.	%	No.	%
Anthropology	85	28.2	215	71.4	1	0.3
Biology	277	92.0	23	7.6	1	0.3
Physics	86	28.6	214	71.1	1	0.3
Economics	158	52.5	142	47.2	1	0.3
Geology	211	70.1	89	29.6	1	0.3
Political Science	118	39.2	182	60.5	1	0.3
Geography	191	63.5	109	36.2	1	0.3
Philosophy	50	16.6	250	83.1	1	0.3
Art	169	56.1	131	43.5	1	0.3
History	182	60.5	118	39.2	1	0.3
Language Arts	168	55.8	132	43.9	1	0.3
Sociology	151	50.2	149	49.5	1	0.3
Mathematics	187	62.1	113	37.5	1	0.3
Physical Education	111	36.9	189	62.8	1	0.3
Chemistry	143	47.5	157	52.2	1	0.3
Religion	20	6.6	280	93.0	1	0.3
Psychology	66	21.9	234	77.7	1	0.3
Fine Arts	98	32.6	202	67.1	1	0.3
Agriculture	14	4.7	286	95.0	1	0.3
Ecology	19	6.3	281	93.4	1	0.3
Home Economics	9	3.0	291	96.7	1	0.3
Voc/Tech	11	3.7	289	96.0	1	0.3
General Science	13	4.3	293	97.3	1	0.3
Health	7	2.3	293	97.3	1	0.3

*N = 301.

TABLE IX

SOURCES OF INSTRUCTIONAL MATERIALS BY FREQUENCY AND PERCENTAGE—TOTAL POPULATION*

	Source of Instructional Material	Primary Source		Secondary Source		Not a Source		Missing Observations	
		No.	%	No.	%	No.	%	No.	%
1.	Published textbook representing a single discipline.	14	4.7	102	33.9	182	60.5	3	1.0
2.	A single published environmental education curricular program (e.g., NEED).	27	9.0	96	31.9	172	57.1	6	2.0
3.	Materials developed by the teaching staff.	247	82.1	42	14.0	11	3.7	1	0.3
4.	Materials developed by the students.	71	23.6	140	46.5	87	28.9	3	1.0
5.	Materials available from various resource agencies (e.g., Soil Conservation Service, Forest Service, etc.).	141	46.8	152	50.5	7	2.3	1	0.3
6.	A combination of commercial and teacher prepared materials.	138	45.8	112	37.2	49	16.3	2	0.7
7.	A combination of commercial, teacher and student prepared materials.	96	31.9	106	35.2	96	31.9	3	1.0
8.	Materials provided by the State Education Agency.	31	10.3	113	37.5	155	51.5	2	0.7
9.	Materials developed by a school-wide or system-wide committee.	68	22.6	84	27.9	146	48.5	3	1.0
10.	Published textbooks representing two or more disciplines.	26	8.6	113	37.5	160	53.2	2	0.7
11.	Mass media (e.g., newspapers, magazines, radio, television, etc.).	63	20.9	158	52.5	79	26.2	1	0.3

*N = 301.

INSTRUCTIONAL STRATEGIES UTILIZED IN PROGRAMS/PROJECTS BY FREQUENCY AND PERCENTAGE -- TOTAL POPULATION*

Instructional Strategy	Often Used		Rarely Used		Never Used		Missing Observations	
	No.	%	No.	%	No.	%	No.	%
1. Lectures	74	24.6	188	62.5	30	10.0	9	3.0
2. Small group projects	270	89.7	22	7.3	1	0.3	8	2.7
3. Seminars	92	30.6	117	38.9	77	25.6	15	5.0
4. Role playing	117	38.9	123	40.9	49	16.3	12	4.0
5. Simulation activities/games	154	51.2	100	33.2	36	12.0	11	3.7
6. Programmed learning	27	9.0	100	33.2	162	53.8	12	4.0
7. Computer assisted instruction	5	1.7	49	16.3	235	78.1	12	4.0
8. Class discussions	252	83.7	32	10.6	6	2.0	11	3.7
9. Panel discussions	105	34.9	130	43.2	55	18.3	11	3.7
10. Individualized activities	230	76.4	57	18.9	5	1.7	9	3.0
11. Teacher/pupil planning	180	59.8	96	31.9	16	5.3	9	3.0
12. Independent study projects	192	63.8	85	28.2	14	4.7	10	3.3
13. Field trip/community resource visits	250	83.1	38	12.6	3	1.0	10	3.3
14. Classroom visits from resource personnel	159	52.8	116	38.5	13	4.3	13	4.3
15. Laboratory activities	206	68.4	67	22.3	19	6.3	9	3.0
16. Behavior/performance contracts	40	13.3	106	35.2	142	47.2	13	4.3
17. Large group instruction	89	29.6	137	45.5	64	21.3	11	3.7
18. Audio-tutorial activities	64	21.3	119	39.5	107	35.5	11	3.7
19. Large group projects	101	33.6	146	48.5	44	14.6	10	3.3
20. Open-ended; problem solving approaches	197	65.4	76	25.2	17	5.6	11	3.7
21. Learning centers	118	39.2	95	31.6	77	25.6	11	3.7
22. Values clarification activities	109	36.2	112	37.2	60	19.9	20	6.6

*N = 301.

TABLE XI

PROGRAM/PROJECT STAFF UTILIZATION AND ORGANIZATION BY FREQUENCY AND PERCENTAGE—TOTAL POPULATION*

Staff Organization/Utilization	Often Used		Rarely Used		Never Used		Missing Observations	
	No.	%	No.	%	No.	%	No.	%
1. Staff members work with a specific group of students in a self-contained classroom environment.	166	55.1	77	25.6	48	15.9	10	3.3
2. Various members of the staff accept responsibility for teaching specific portions of the program, but do so independently.	111	36.9	100	33.2	74	24.6	16	5.3
3. Staff operates as a teaching team.	176	58.5	62	20.6	51	16.9	12	4.0
4. Resource and support specialists from outside the school are available to assist the teaching staff (e.g., SCS, NPS, etc.)	168	55.8	86	28.6	34	11.3	13	4.3
5. Various staff members serve as resource persons to assist in curriculum planning.	202	67.1	66	21.9	22	7.3	11	3.7
6. Appropriate staff members serve as guest lecturers, experts, etc.	141	46.8	120	39.9	32	10.6	8	2.7
7. Staff works with volunteers.	150	49.8	90	29.9	50	16.6	11	3.7
8. Staff trains regular teachers to conduct entire program.	150	49.8	68	22.6	71	23.6	12	4.0

*N = 301.

TABLE XII

PROGRAM/PROJECT EVALUATION METHODOLOGIES AND PROCEDURES
BY FREQUENCY AND PERCENTAGE -- TOTAL POPULATION*

Methodology/Procedure	Often Used		Rarely Used		Never Used		Missing Observations	
	No.	%	No.	%	No.	%	No.	%
1. Program or project evaluation is conducted:								
a. Formally (e.g., following a prescribed evaluation plan)	130	43.2	88	29.2	57	18.9	26	8.6
b. Informally (e.g., no predetermined evaluation design is followed)	152	50.5	83	27.6	41	13.6	25	8.3
c. Both formally and informally	148	49.2	70	23.3	52	17.3	31	10.3
d. Internally by program personnel	213	70.8	36	12.0	23	7.6	29	9.6
e. Externally by nonprogram personnel	84	27.9	95	31.6	97	32.2	25	8.3
f. Both internally and externally	119	39.5	72	23.9	76	25.2	34	11.3
2. Procedures are used to determine if the stated program objectives have been achieved.	183	60.8	67	22.3	35	11.6	16	5.3
3. Observed changes in student behaviors are used as an index to evaluate the effectiveness of this program on participants.	207	68.6	67	22.3	14	4.7	13	4.3
4. Evaluation procedures are conducted which are directed at:								
a. Curriculum revision	209	69.4	55	18.3	18	6.0	19	6.3
b. Program improvement	260	86.4	20	6.6	6	2.0	15	5.0
c. Improvement of instruction	243	80.7	32	10.6	10	3.3	16	5.3
5. Students are evaluated on the basis of their performance compared to a class or group average.	77	25.6	89	29.6	117	38.9	18	6.0
6. Provisions are made to evaluate students in areas of:								
a. Skill development	163	54.2	82	27.2	37	12.3	19	6.3
b. Cognitive knowledge	189	62.8	64	21.3	29	9.6	19	6.3
c. Attitude development and change	223	74.1	47	15.6	17	5.6	14	4.7

TABLE XII (Continued)

Methodology/Procedure	Often Used No.	Often Used %	Rarely Used No.	Rarely Used %	Never Used No.	Never Used %	Missing Observations No.	Missing Observations %
7. Students are evaluated on the basis of their performance compared to prespecified performance objectives.	126	41.9	94	31.2	60	19.9	21	6.9
8. Provisions are provided for:								
a. Student self-evaluation	133	44.2	100	33.2	47	15.6	21	7.0
b. Teacher evaluation of students	211	70.1	47	15.6	23	7.6	20	6.6
c. Cooperative student-teacher evaluation	136	45.2	101	33.6	44	14.6	20	6.6
d. Student peer evaluation	47	15.6	113	37.5	113	37.5	28	9.3
9. To what extent are the following evaluation strategies used in this program:								
a. Anecdotal records	75	24.9	89	29.6	106	35.2	21	10.3
b. Interviews	117	38.9	103	34.2	57	18.9	24	8.0
c. Questionnaires	143	47.5	89	29.6	47	15.6	22	7.3
d. Standardized tests	56	18.6	77	25.6	142	47.2	26	8.6
e. Attitude Scales	74	24.6	98	32.6	104	34.6	25	8.3
f. Open-ended self-report	141	46.8	77	25.6	63	20.9	20	6.6
g. Accomplishments related to problem resolution	152	50.5	66	21.9	53	17.6	30	10.0

*N = 301.

TABLE XIII

CURRICULUM DEVELOPMENT CONSTRAINTS BY FREQUENCY AND PERCENTAGE -- TOTAL POPULATION*

Constraint	Primary Constraint		Secondary Constraint		Not a Constraint		Missing Observations	
	No.	%	No.	%	No.	%	No.	%
1. Confusion as to what environmental education curricula should encompass.	28	9.3	90	29.9	164	54.5	19	6.3
2. Lack of appropriate curriculum material for teaching environmental education.	41	13.6	100	33.2	142	47.2	18	6.0
3. Lack of a generally accepted definition of environmental education.	19	6.3	75	24.9	186	61.8	21	7.0
4. Inadequate funding at all levels.	100	33.2	111	36.9	72	23.9	18	6.0
5. Inadequate preservice teaching training.	90	29.9	121	40.2	72	23.9	18	6.0
6. Inadequate in-service teacher training.	78	25.9	122	40.5	83	27.6	18	6.0
7. Lack of communication between the disciplines.	63	20.9	113	37.5	104	34.6	21	7.0
8. The technical complexity of ecological/ environmental knowledge.	34	11.3	114	37.9	132	43.9	21	7.0
9. Inadequate evaluation of past and present environmental education efforts.	44	14.6	90	29.9	146	48.5	21	7.0
10. The current spin-offs from the energy crisis.	19	6.3	87	28.9	173	57.5	22	7.3
11. Inadequate leadership at the national level.	55	18.3	62	20.6	163	54.2	21	2.0
12. Inadequate leadership at the state level.	55	18.3	64	21.3	162	53.8	20	6.6
13. Inadequate leadership at the local level.	40	13.3	72	23.9	168	55.8	21	7.0
14. Lack of time to develop curriculum.	92	30.6	113	37.5	78	25.9	18	6.0
15. Insufficient room in the curriculum to add environmental education.	54	17.9	105	34.9	123	40.9	19	6.3
16. Lack of a political or legislative mandate.	47	15.6	78	25.9	157	52.2	19	6.3
17. Lack of available appropriate expertise.	28	9.3	66	21.9	187	62.1	20	6.6
18. Lack of acceptance by teachers.	31	10.3	101	33.6	146	48.5	23	7.6

*N = 301.

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